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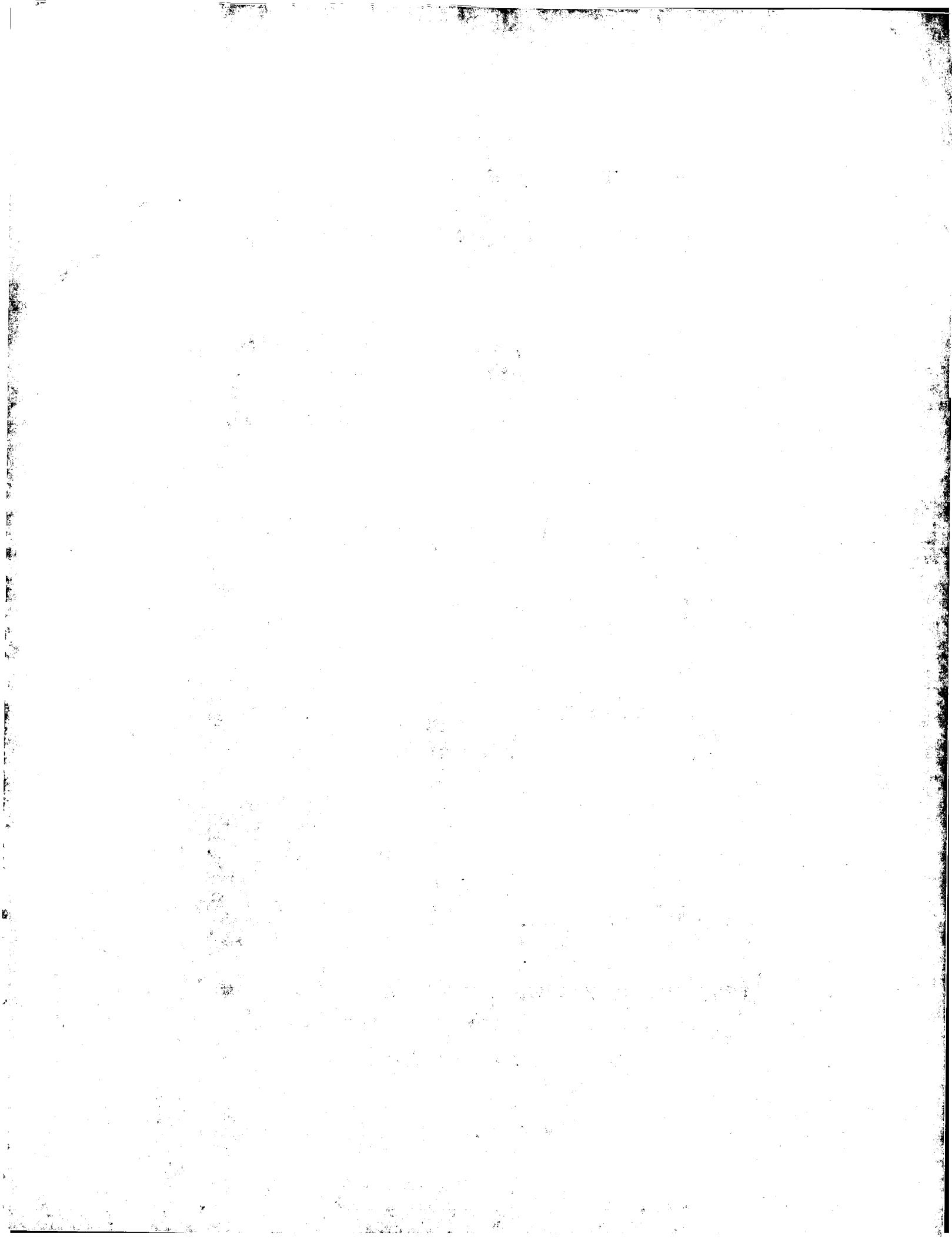
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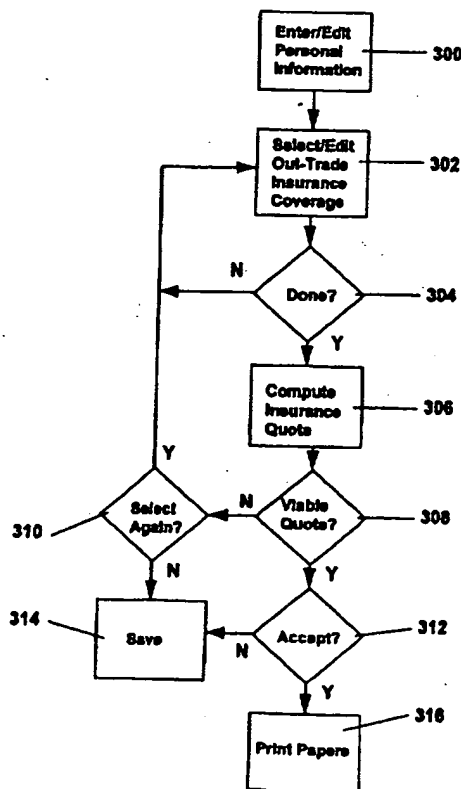
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(54) Title: AN ELECTRONIC OUT-TRADE INSURANCE SYSTEM

(57) Abstract

An electronic out-trade insurance system is provided in which a user specifies an insurance profile and a premium quote is calculated. Out-trade insurance concerns insurance provided to commodity traders to protect against losses arising from unmatched trades. The calculation of an out-trade insurance premium is a function of the insured, the commodity covered, the retention, the maximum ticket size covered, and the policy's liability limit and term. A printer may be added to the computer system to provide for the immediate generation of insurance forms.



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## AN ELECTRONIC OUT-TRADE INSURANCE SYSTEM

### FIELD OF THE INVENTION

5           The present invention relates to an electronic insurance system and, in particular, to an electronic system for preparing quotes and related items for out-trade insurance.

### BACKGROUND AND SUMMARY OF THE INVENTION

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          Out trades are trading transactions associated with financial exchanges, such as the Chicago Mercantile Exchange (CME), Chicago Board of Trade (CBT), Chicago Stock Exchange (CSE), Chicago Board Options Exchange (CBOE), MidAmerican Commodity Exchange (MACE), Kansas City Board of Trade (KCBT), New York Mercantile Exchange (NYMEX), New York Commodity Exchange (COMEX) (now a division of NYMEX), New York Cotton Exchange (NYCE), New York Futures Exchange (NYFE) and other futures and options exchanges. In a typical commodities exchange, purchases and sales are made through hand signals, shouting, and other rapid deal-making techniques. The buyer and seller each memorialize the transaction on a trading card or other similar document (all such documents simply referred to here as a "card"). A problem can occur when either the buyer or seller of the transaction does not agree on the essential terms of the trade, or in the case of a trader executing a customer order, when the trade does not match the essential terms of the customer order. The former problem is known as a unmatched trade while the latter problem is known as a broker error. The most universal combined term for both unmatched trades and broker errors are "out trades."

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          For most transactions, the terms of the trade match between the buyer and seller and a cleared trade is made. In the Chicago Mercantile Exchange, for example, each party actually submits a "trading card" which is then matched by

their respective clearing firms. However, with regard to certain transactions, the trades do not match. In addition to "out trades," other names for unmatched trades include "uncompared trades" (NYFE), "unmatched trades" (NYCE) and "cut-outs" (NCBT). In any event, an unmatched trade may arise where there is only one card that represents the trade or where two apparently paired cards do not match with regard to certain core information. The core information on each card typically identifies the buyer, the seller, the commodity subject to the trade, and price, quantity and time information.

Distinct names are often used to designate different unmatched trades. For example, a "who trade" occurs where one party to the trade cannot be identified or once identified denies that the trade occurred. A "price out" occurs where price terms on two apparently paired cards do not match, and a "quantity out" occurs where quantity terms do not match. A "firm out" is a frequently occurring out trade in which either the buyer's or seller's trading firm or trader designation is mistakenly identified on one of the two trade cards. Most trades are often reconciled by identifying the proper transacting parties.

However, many unmatched trades are not reconciled. Unmatched trades that are not reconciled may have neutral, positive, or adverse economic consequences to the trader. The out trades that are pertinent to the electronic out-trade insurance system of the present invention are those that have adverse economic consequences. This occurs where the market moves adversely to the desired trader. For example, if Trader Smith executes a buy for 10 lots of a given commodity from Trader Jones only to discover that Trader Jones never acknowledged the transaction, Trader Smith must reconcile or recover his trade by executing another buy order for 10 lots. If the market for the commodity purchased went up in price between the time of the original buy trade with Trader Jones and the subsequent recovery trade, Trader Smith will suffer adverse economic consequence. In general, this adverse economic consequence cannot be passed on to any other person or customer.

The above example was a loss arising from an unmatched trade.

However, similar adverse economic consequences can occur from a broker error. For example, with regard to a buy order for 10 lots of a commodity mistakenly filled with a purchase of only 5 lots, an adverse economic consequence occurs on the buy side if the commodity that is the subject of the trade moves up in price. The trader responsible for the trade must then purchase the unfilled portion of the trade at the higher price, sustaining an economic loss. In general, this economic loss may not be passed through to the customer that placed the order where the trade was negligently executed.

To protect against the economic losses of out trades, the electronic out-trade insurance system of the present invention may be used. Using this system, insurance may be offered that is specific to a particular exchange, commodity, and individual. An exchange is any financial exchange on which options or futures are traded, and a commodity includes anything traded on such an exchange. For example, on the Chicago Mercantile Exchange, options and futures are traded in agricultural goods (such as cattle, lumber, and pork bellies), currencies (such as the Australian Dollar, Canadian Dollar, and French Franc), interest rates (such as T-Bills, Libor and Eurodollars) and market indexes (such as the S&P500 and Russell 2000 indexes). The individuals subject to out-trade insurance protection are the floor brokers and floor traders who execute orders. A floor broker is an individual who trades on behalf of other Exchange members or public customers. By contrast, a floor trader, sometimes known as a "local," trades for his own personal account.

The electronic out-trade insurance system of the present invention is implemented on a computer. The computer stores data from which premiums may be calculated. The data used to calculate premiums will be based on a commodity and its trading history, the person covered by the policy and his or her trading history, and the desired scope of coverage. Among other things, a commodity's trading history may be based on its frequency of being out-traded and its price volatility. A person's trading history may reflect a number of factors, including his or her annual number of transactions, average ticket size

(i.e., average number of lots per trade) and out-trading frequency, his or her use of a "checker" in particular commodity pits, his or her trading experience and net worth, and numerous other factors. The desired scope of coverage will be based on the maximum ticket size (i.e., maximum number of lots) covered by the policy, the retention (i.e., deductible) to which claims are subject, the liability limit (i.e., maximum claim) covered by the policy, and the term (i.e., duration) of the coverage. Several other factors, including numerous subjective underwriting factors forming a matrix of interlocking exposure-based relationships, may be reflected in the data from which premiums are calculated.

The data from which premiums are calculated is coupled with software for collecting an insurance profile and for computing a premium. The insurance profile identifies the insured, the commodity or commodities subject to a policy, and the particulars of the policy (including maximum ticket sizes, retentions, liability limits, and term). The computation process produces a quotable premium, or indicate that a premium is unavailable for the particular coverage sought. If coverage is not available, the insurance profile may be wholly or partially altered, or the system may optionally provide an override feature for permitting coverage. After a viable insurance profile is entered and a premium is quoted, forms may be generated and sent to an optional printer connected to the computer. An application may be made, the forms may be signed, and a valid and binding insurance agreement entered in less than ten minutes.

It is a significant aspect of the present invention that the calculation of reliable premiums is almost instantaneous. Prior to the present invention, out-trade insurance was not feasible, because a method for quickly computing a reliable insurance quote was not heretofore available. With the present invention, an insurance profile may be entered and a reliable, real-time quote produced in under ten minutes from the time a floor trader or floor broker begins the process. With this invention, out trade insurance is, as a practical matter, being born. Accordingly, the present invention makes feasible for the first time the provision of out-trade insurance on an exchange floor, and provides a

realistic insurance option for floor traders and floor brokers who demand prompt, convenient, and fair service.

### DESCRIPTION OF THE FIGURES

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The foregoing advantages of the present invention are apparent from the following detailed description of the invention with reference to the drawings, in which:

10 FIG. 1 shows an illustrative computer system to which the present invention applies;

FIG. 2 shows a block diagram of the components of a computer system to which the present invention applies;

FIG. 3 shows a flow chart of a process for collecting an insurance profile and for computing a premium; and

15 FIG. 4 through FIG. 7 show portions of an illustrative user interface for creating an insurance profile.

### DETAILED DESCRIPTION OF THE INVENTION

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FIG. 1 shows an illustrative computer system 100 to which the present invention applies. Computer system 100 contains data storage devices, a central processing unit, a power source, and connections for peripheral devices. Peripheral devices typically connected to computer system 100 include one or more output devices, such as video monitor 102 and printer 108, and one or more input devices, such as keyboard 104 and pointing device 106. Computer system 100 may be any of several commercially available computer systems available from Apple, Compaq, Dell, Digital, Hewlett Packard, IBM and others. A successful prototype and preferred embodiment of the invention has been developed on a Dell personal computer with an Intel Pentium processor, running a macro software program written with Release 4.0 of Lotus 1-2-3 for Windows.

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This prototype has been designed for use with the Chicago Mercantile Exchange and contains data based specifically on this exchange. Those of ordinary skill in the art may select and implement the present invention on other computer systems, with other core software programs, and for other financial exchanges.

5           FIG. 2 shows a block diagram of the components of a computer system to which the present invention applies. Central processing unit 200 contains one or more microprocessors for executing the computer software programs necessary to implement the present invention. Central processing unit 200 is typically connected to primary storage 202 and system bus 204. Primary storage 202 is  
10 typically volatile storage, such as RAM. The programs and data for implementing the present invention are stored on a temporary basis in primary storage 202 during execution. Typically, only a portion of the programs and data fit in primary storage 202 at any particular time. Cache memory may also be included with central processing unit 200 or primary storage 202 to speed  
15 program execution.

System bus 204 connects the components of the computer system, and may be based on an open architecture, such as Peripheral Component Interconnect (PCI), or on a proprietary design. Several devices are connected to system bus 206. Secondary storage 206 is typically nonvolatile storage, such as  
20 an optical or magnetic disk drive. The programs and data for implementing the present invention are stored on a permanent basis in secondary storage 206. Input device 208 may include keyboard 104 or pointing device 106, and output device 210 may include video monitor 102 or printer 108. In some computer systems, input device 208 and output device 210 are connected directly to  
25 central processing unit 200, rather than through system bus 204.

FIG. 3 shows a flow chart of a process for collecting an insurance profile and for computing a premium. In step 300, the personal information of a prospective insured is collected. Among other things, this information may include biographical information, such as the trader's name and address, the  
30 trader's status as a floor trader or a floor broker, net worth, clearing firm, trading

association and trading identification number. In addition to biographical information, statistical information about the person's trading history in each commodity of interest is obtained. This information may include historical data on the trader's total number and volume of transactions in the commodity, average ticket size in the commodity, years of trading history, largest historical out-trade, use of a trading "checker," history of major trade violations, and aggregate out-trade frequency for all commodities. Preferably, this information is obtained from a personalized Broker Out-Trade Percentage ("BOP") report, obtained from the exchange or an independent third-party auditor. This both speeds the process of obtaining out-trade insurance and provides the insurer with a degree of certainty regarding the accuracy of the data. Additional information about the trade may be obtained, such as the information discussed in further detail with regard to FIG. 5.

In step 302, out-trade insurance coverage is selected. A minimum of five factors must be specified, either by default value or user selection. The five factors include a commodity, a retention, a maximum ticket size, a liability limit, and a term of coverage. A commodity is anything traded on the exchange, and one or more commodities may be covered. For each commodity, a retention, a maximum ticket size, a liability limit, and a term are specified. Where more than one commodity is covered, these five factors may also be defined as aggregate measures. In the preferred embodiment of the invention, a single annual liability limit applies per trade and in the aggregate, a single default term of one year applies to all coverage, and separate retentions and maximum ticket sizes apply to each commodity covered. Out-trade insurance claims are reimbursed on an annual basis for verifiable out-trade losses where proof of loss is shown. Out-trade losses are reimbursed up to the liability limit (less the retention) for claims based on trades of lot sizes no greater than the maximum lot size covered. In the preferred embodiment of the invention, it is possible to obtain coverage for unlimited lot sizes by entering a "u" for maximum lot size. Unlimited lot sizes, however, are only available to floor brokers who elect a retention of at least

\$100,000 and who have at least one year of experience. Step 304 loops program control back to step 302 until the plan for a trader's out-trade insurance is fully specified.

5 In step 306, an out-trade insurance premium is computed and quoted to the trader. A premium is based on a matrix of interlocking underwriting decisions relating to, among other things, the amount of risk the underwriter is willing to bear under what circumstances and its desire to achieve a particular loss ratio. A static formula may be used to calculate all premiums, or different formulas may be used for different types of coverage. A formula for computing  
10 an overall premium may account for, or provide a discount for, insuring multiple commodities. A minimum premium may be required. In the preferred embodiment, separate actuarial tables are used for each retention of each commodity. For example, retentions of \$25,000, \$50,000, and \$100,000 are offered for trades of futures and options in ninety-day treasury bills, and three  
15 separate actuarial tables are used. For other commodities, more retentions are offered and more tables are required. Each table interlocks with each other table resulting in a net matrix of debits and credits, or an indication that the program cannot generate a premium.

20 The formula for computing a premium is based on an analysis of the risk presented by a commodity and the risk presented and coverage requested by a trader. A commodity's risk is characterized by severity and frequency. The severity of a commodity's risk may be determined from its intra-day volatility and trading volume. Since most exchanges require reconciliation of all trades by the beginning of the next trading session, intra-day factors are a good measure of  
25 risk severity. The frequency of a commodity's risk may be determined from the number and size of out trades in the commodity. While the frequency of out-trading activity varies by exchange and commodity, it is typical for out trades to number between two and six percent of all trades in a commodity. Basic frequency data is further analyzed to determine the frequency of out trades  
30 resulting in negative economic consequences of the type compensable under

out-trade insurance.

The risk presented by a trader and the scope of coverage requested by the trader are also used in computing a premium. A trader's risk is represented in the BOP report obtained in step 300, while the trader's requested coverage is captured in the data collected in step 302. The BOP report shows the trader's total number and volume of transactions in the commodity, the trader's out-trade frequency in the commodity, and the trader's average ticket size in the commodity. The requested coverage is shaped by the commodity subject to coverage as well as the selected values for retention, maximum ticket size, liability limit, and term of coverage. In the preferred embodiment, a formula is used to compute a premium from these various commodity and trader factors. The calculated premium is further adjusted based on credits or debits arising from additional detailed information about the trader, such as the information discussed in further detail with regard to FIG. 5.

An underwriter may decide that certain coverage requests are not possible. This may arise, for example, for novice traders with less than one month of experience, for traders who have out-trade frequencies greater than twice the average, for traders with a history of especially large out-trades, for traders who do not use a "checker" in those pits the underwriters believes a "checker" is a necessary risk management precaution, or for a variety of other factors. In step 308, the premium computed in step 306 is tested. If a premium was not computed, the program signals this fact with a dialogue box 700 like the one shown in FIG. 7. When the user clicks button 702 to continue, he or she is presented with a description of what aspect of the coverage request was not possible. Pursuant to step 310, control may then return to step 302 to edit the requested coverage, or control may pass to step 314 to store the insurance profile for future recall and use. In the preferred embodiment, a call to the home office may permit the system's refusal to allow coverage to be overridden.

If step 306 successfully computes a quote for the requested out-trade insurance coverage, this quote is presented for review to the trader in step 312.

If the trader elects to accept coverage, control transfers to step 314, in which papers are generated for printing and sent to printer 108. These papers may include a written quote, an out-trade insurance application, and an out-trade insurance policy. Upon execution, these papers may be used as the basis of a binding out-trade insurance policy or quote on such a policy. If the trader elects to decline coverage, control transfers to step 314 to store the insurance profile for future recall and use. In the preferred embodiment, it is also contemplated that control may immediately return to step 302 where the requested coverage may be altered in real time until the trader is presented with a suitable price/coverage point.

FIG. 4 through FIG. 7 show portions of an illustrative user interface for creating an insurance profile. Dialogue box 400 shows various fields for the entry of information about the trader and the scope of coverage sought. Trader-bio fields 402 record biographical information about the trader, including name, address, and telephone number. Trader-type fields 404 identify whether the trader is a floor trader or a floor broker. Trader-id fields 406 are for the entry of the trader's identification numbers. The scope of coverage sought is listed in scope-of-coverage fields 408. These fields identify the commodities subject to the policy request as well as information about the commodity and the coverage sought. In FIG. 4, the scope-of-coverage fields 408 show the average ticket size for the commodity and the annual number of transactions in the commodity. The fields also show the trader's requested maximum ticket size and retention for coverage. In FIG. 4, representative entries are shown for futures in lumber and options in ninety-day treasury bills. With regard to the ninety-day treasury bills, the "u" indicates that coverage for an unlimited lot is sought. Liability-limit field 410 specifies the aggregate and individual liability limit of the policy sought. If a premium is quotable, it is displayed in quoted-premium field 412. If a premium is not quotable, dialogue box 700 shown in FIG. 7 is displayed.

Dialogue box 400 includes several other features. Time stamp 414 displays the day and time of a transaction or quote. Title block 416 displays the

name of the underwriter and the exchange underwritten. Here, the assignee of the present invention, American International Group Inc., is shown as the underwriter, and the Chicago Mercantile Exchange is shown as the underwritten exchange. Quote-id field 418 records an identification number for a quote or policy, which may be used in storing and recalling a quote or policy for future consideration. Button bar 420 has several buttons for activating features, including new-coverage entry, coverage modification, printing, and program exit.

FIG. 5A shows dialogue box 500, which is activated as part of the entry of a trader's personal information in step 300. Various credits or debits arise from the additional detailed information concerning the trader that is entered in dialogue box 500. Table 502 collects information about a trader's experience and net worth. Increased experience and greater net worth result in credits, while limited experience and low net worth result in debits or the denial of coverage. Numeric field 504 collects data about the trader's aggregate out-trade frequency in the prior year. If it is high, a debit is generated. For intolerably high out-trade frequencies, coverage may be denied. Boolean field 506 identifies whether the trader had an out trade in the last year greater than 150% of a requested retention, and boolean field 508 identifies whether the trader had a major trade violation in the last five years. If either is true, coverage may be denied.

FIG. 5B shows dialogue box 510, which accompanies dialogue box 500. Boolean fields 512 and 514 identify whether the trader uses a checker in certain commodity pits. The use of a checker may be required for coverage of large maximum lot sizes. Boolean field 516 permits the addition of the broker's E&O rider, which provides the insurance coverage for the broker errors type of out trade, and boolean field 518 identifies whether the BOP report is attached. Fields 520, 522, and 524 identify information about the trader's associations and employment, and boolean field 526 identifies whether the trader ever exercises discretion when trading for public customers.

FIG. 6 shows dialogue box 600, which is activated as part of the entry of

out-trade insurance coverage in step 302. Selection box 602 is used to select a commodity, while selection box 604 is used to select a corresponding retention. Box 606 identifies whether coverage is sought for the commodity as a future or as an option. Additional commodities may be added by clicking on button 608 and selecting the new commodity information. Completion of the process of commodity entry may be signaled by clicking on button 610.

The process for collecting an insurance profile and for computing a premium as shown in FIG. 3 will be codified in a computer program. This computer program and related data (such as data representing the user interface shown in FIG. 4 through FIG. 7, and data representing the actuarial tables used for calculating premiums) will be stored on a permanent basis in secondary storage 206 of computer system 100. The program and data will be read, in whole or in part, into primary storage 202 of computer system 100 for execution at run time. The central processing unit 200 of computer system 100 will execute the commands comprising the program for performing the process of FIG. 3. One of ordinary skill in the art would recognize that this computer program can be written in a number of ways. Any user, including a representative of the underwriter, the prospective insured, or any other person, will be capable of running and executing the computer program.

As one illustrative example, a successful prototype and preferred embodiment of the invention has been developed with Release 4.0 of Lotus 1-2-3 for Windows. The portion of the spreadsheet visible to a user contains the dialogue boxes shown in FIG. 4 through FIG. 7. A portion of the spreadsheet that is not visible to the user contains macro commands for executing the process of FIG. 3. The user is directed to enter the appropriate data in each of the dialogue boxes. A portion of the spreadsheet that is not visible to the user contains actuarial tables for each commodity and retention. These tables are consulted in the calculation of a premium. The built-in calculation features of Lotus are used to produce a premium quote. As an alternative to spreadsheet software, suitable software could be developed with a dedicated programming

language (such as C or Visual Basic) or with database software (such as dBase or FoxPro).

Although the invention has been shown and described in terms of a preferred embodiment and a particular user interface, those of ordinary skill in the art will realize that other embodiments and interfaces may be constructed within the meaning of the present invention. Alternative systems may be designed around other computer systems, with other core software programs, and for other financial exchanges. Those of ordinary skill in the art will apply the teachings of the present invention to different data types and numeric calculation engines, including look-up tables, database files, linked lists, multi-dimensional arrays, fixed formulas, interpolative algorithms, and other forms of data organization and calculation. Various programming techniques and languages may also be used, including both procedural and object-oriented. Based on the software and system used, the specific financial exchange addressed, and underwriting choices made by the underwriter, alternative user interfaces will also be used. Several embodiments of the invention may be constructed without departing from the spirit of the invention as claimed below.

We claim:

1. An electronic out-trade insurance system, comprising:  
input means for a user to select at least one factor of an insurance  
profile, said insurance profile comprising an insured, a commodity,  
a retention, a maximum ticket size, a liability limit, and a term,  
wherein said factors not selected by the user are assigned default  
values;  
processor means for calculating a premium quote for said insured based  
on said insurance profile; and  
output means for presenting said premium quote to said user.
2. The electronic out-trade insurance system of claim 1, wherein said  
insurance profile further comprises data about the trading history of said insured.
3. The electronic out-trade insurance system as in either of claims 1  
or 2, further comprising printer means for generating insurance documents  
reflecting said insurance profile and said premium quote.
4. The electronic out-trade insurance system as in either of claims 1  
or 2, wherein said processor means calculates said premium quote as a  
coverage-denied quote where said insurance profile is objectionable.
5. A data storage device in a computer system for quoting out-trade  
insurance, said data storage device comprising:  
a first set of data comprising an insurance profile, said insurance profile  
comprising an insured, a commodity, a retention, a maximum ticket  
size, a liability limit, and a term;  
a second set of data comprising a plurality of actuarial tables;  
a third set of data comprising a computer program for calculating a  
premium quote using said insurance profile and at least one of said  
actuarial tables.
6. The data storage device of claim 5, wherein said insurance profile  
further comprises data about the trading history of said insured.
7. The data storage device as in either of claims 5 or 6, wherein said

computer program calculates said premium quote as a coverage-denied quote where said insurance profile is objectionable.

**FIG. 1**

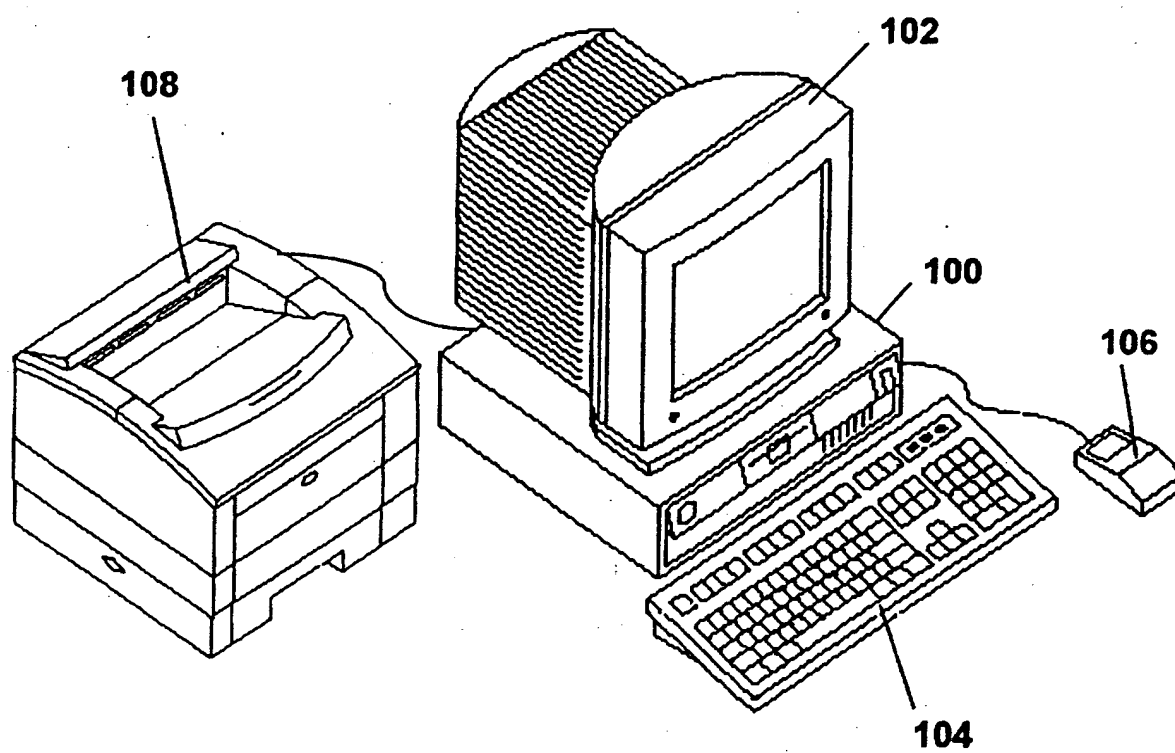
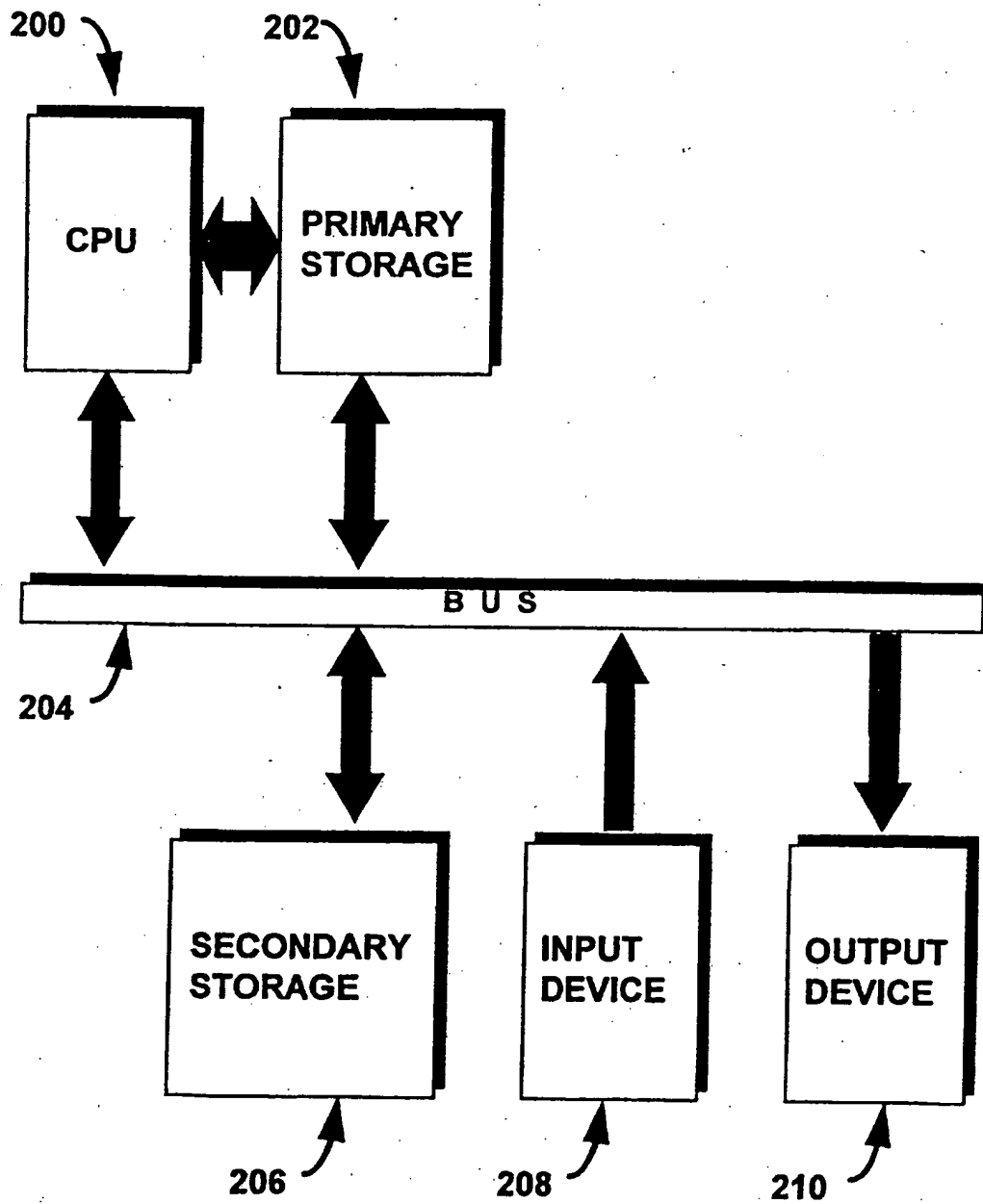
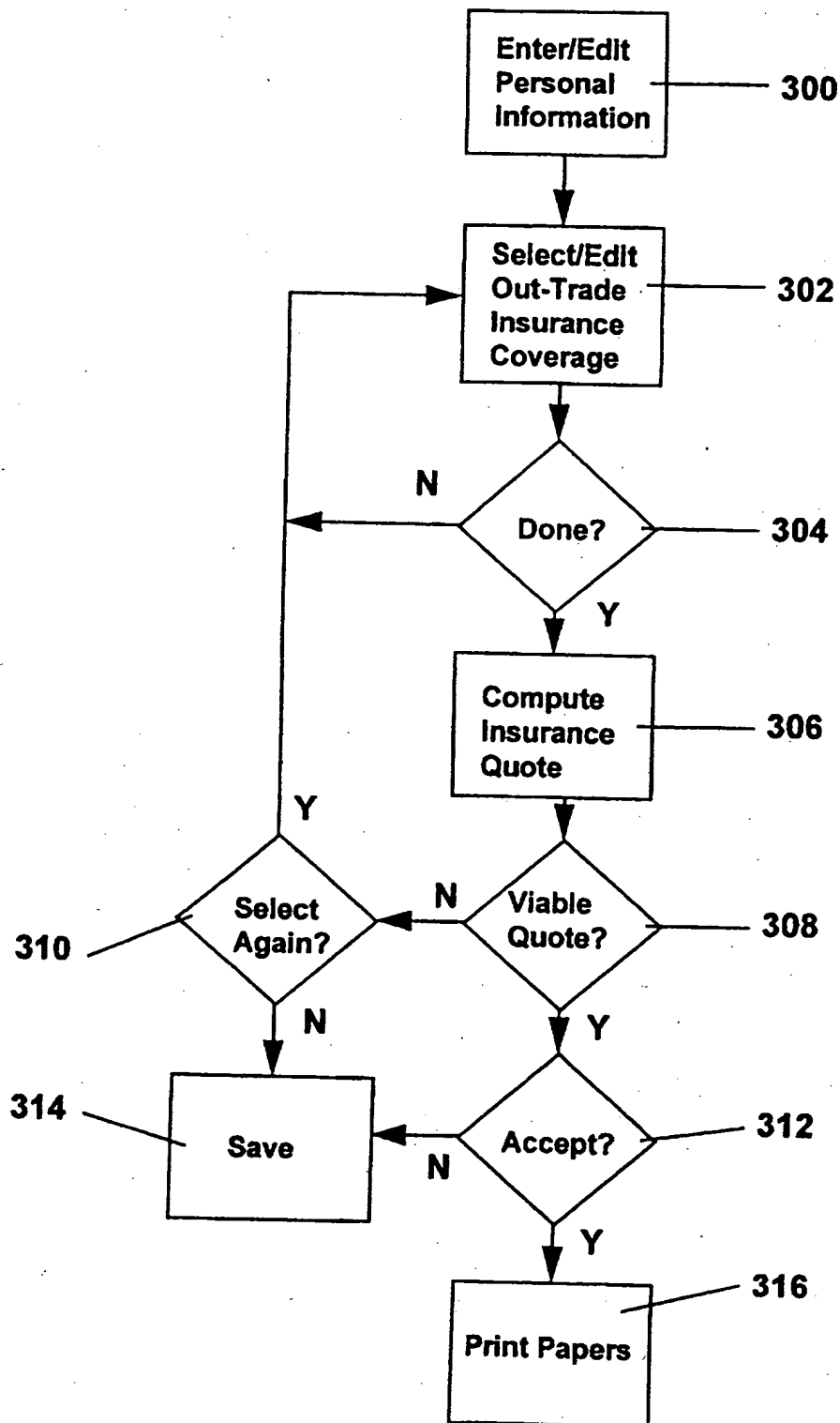


FIG. 2



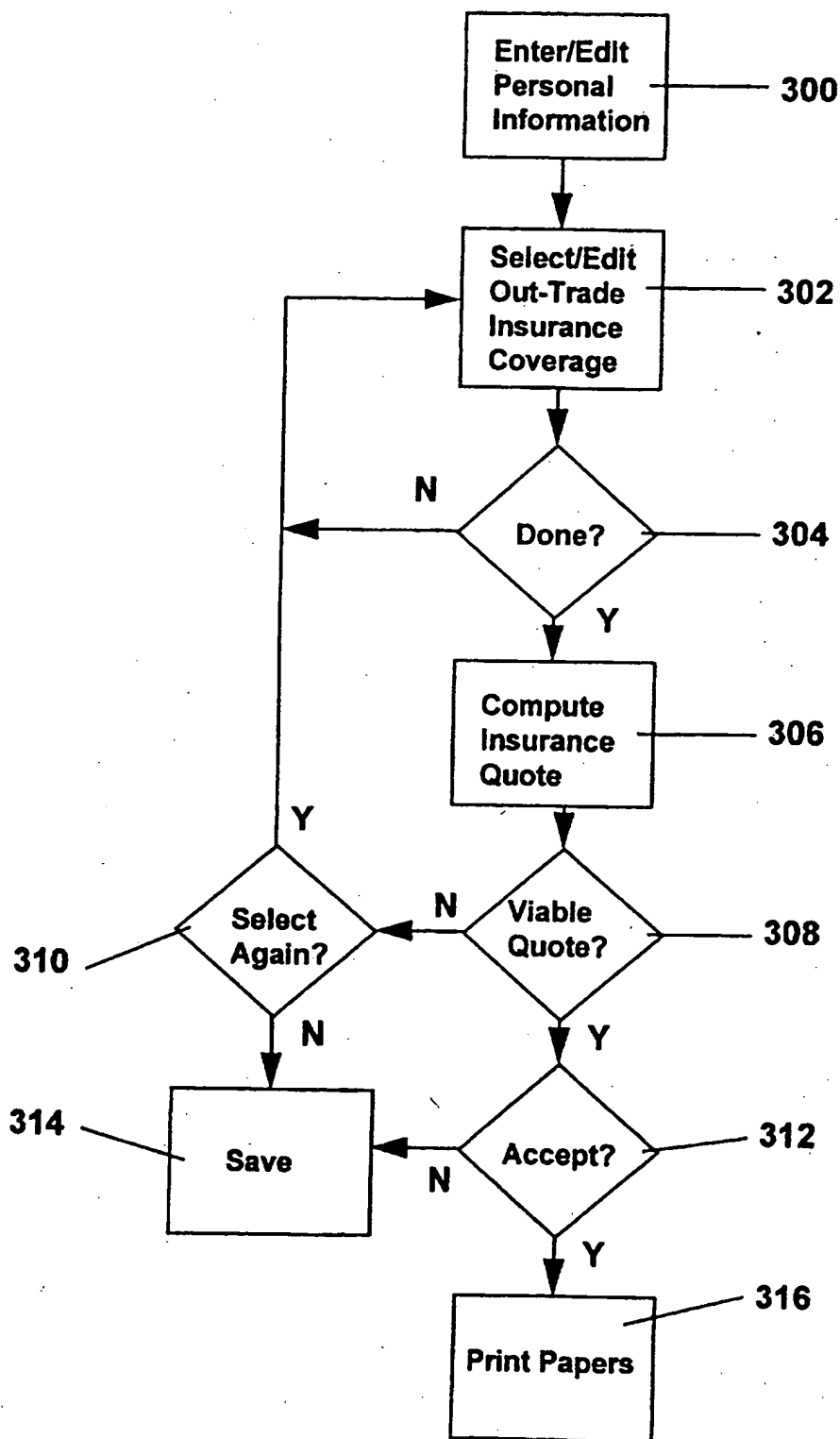
**FIG. 3**

3/7



**FIG. 3**

3/7



**FIG. 4**

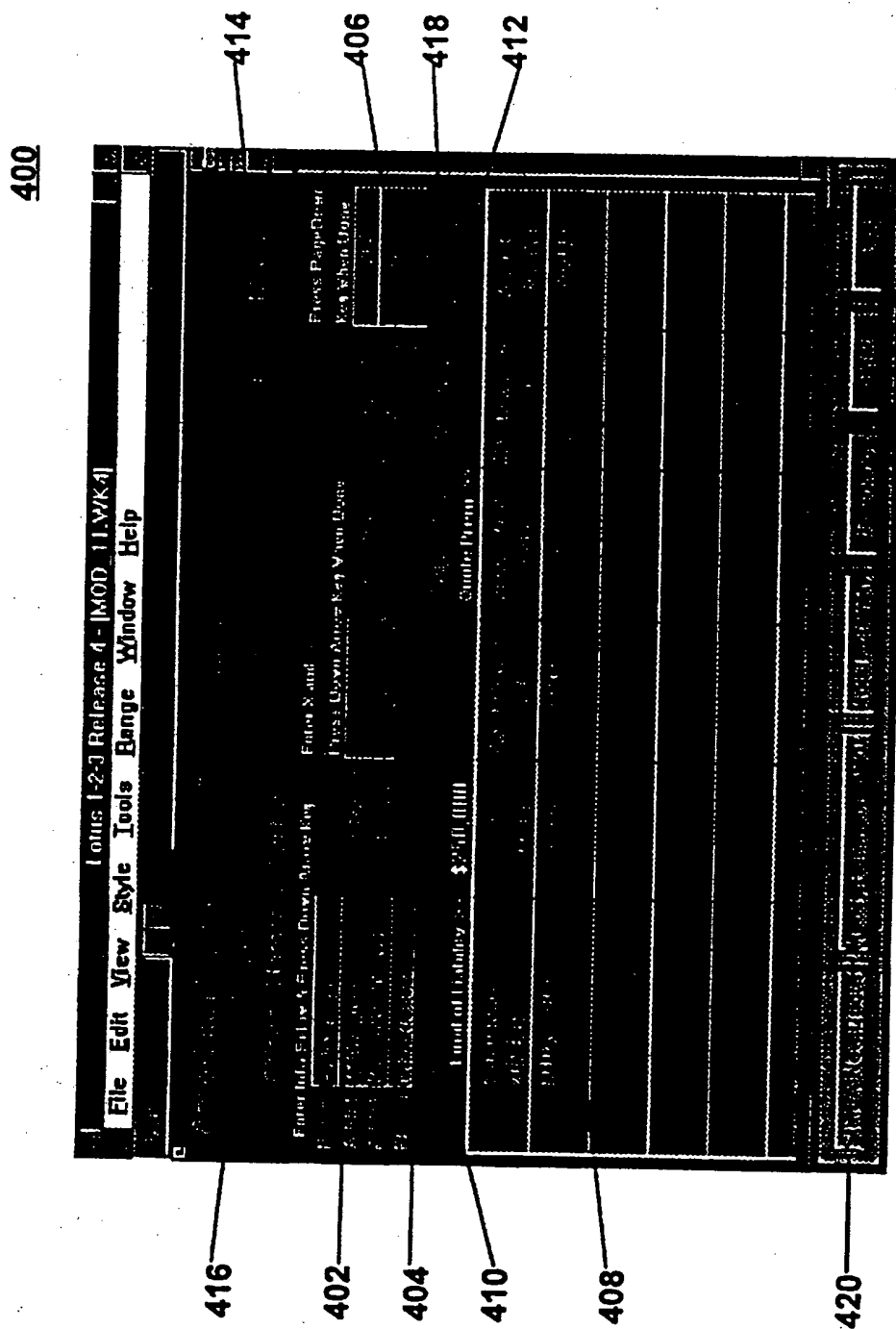


FIG. 5A

500

Lotus 1-2-3 Release 4 - [MOD 11/1/94]

File Edit View Style Tools Range Window Help

Select Appropriate Items:  
Select Only ONE Item Per Group.

[A] Scheduled Rating (Enter X)  Total Factor (A)   
Yrs In Business:  Net Worth:  (Enter X)

[B] Out-Trade % In The Last Year Is  Press PageDown Key When Done  
Enter a % Mo. (e.g. Enter 8 for 8%)  
Press PageDown Key When Done  
Enter Y or N

[C] Did You Have Largest Out-Trade In The Last Yr > 150% of Retention Requested? Press PageDown Key When Done  
Enter Y or N

[D] Have You Had a MAJOR Trade Violation In The Last Five Years? Press PageDown Key When Done

502

504

506

508

FIG. 5B

510

File Edit View Style Tools Range Window Help	
512	[E1] Do You Use/Share a Checker In The Eurodollar Pit? Enter Y or N Press PageDown Key When Done
514	[E2] Do You Use/Share a Checker In The S&P 500 Pit? Enter Y or N Press PageDown Key When Done
516	[F] Do You Want To Add Broker's E & O Rider? Enter Y or N Press PageDown Key When Done
518	[G] Is Broker Out-Trade % Report Attached? Enter Y or N Press PageDown Key When Done
520	[H] Are You A House Broker? Enter Y or N Press PageDown Key When Done
522	[I] Enter Name of The Clearing Firm You Associate With: Enter Name Press PageDown Key When Done
524	[J] Are You A Member of A Trading Assoc.? Enter Y or N Press PageDown Key When Done
526	[K] Do You Ever Exercise Discretion When Trading For Public Customers? Enter Y or N Press PageDown Key When Done

FIG. 7

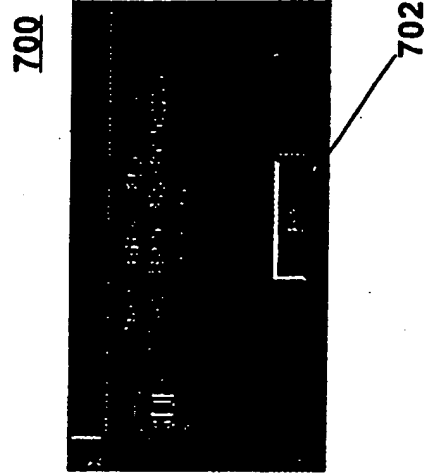
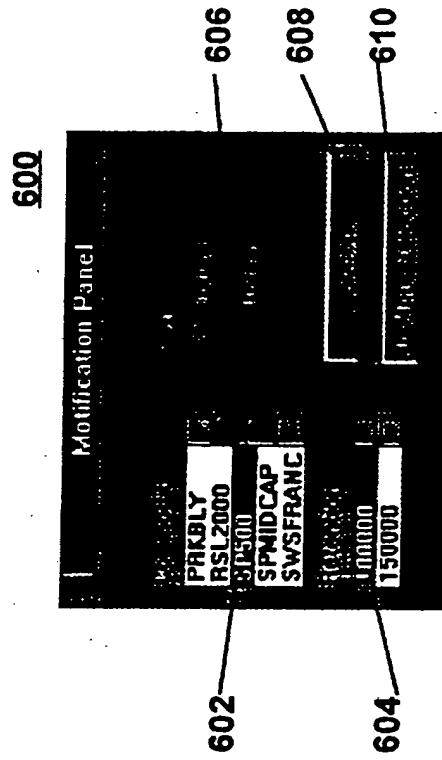


FIG. 6



# INTERNATIONAL SEARCH REPORT

Int onal Application No  
PCT/US 97/06755

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 G06F17/60

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 839 804 A (ROBERTS ET AL) 13 June 1989 see page 5, line 12 - line 39 ---	1-7
A	US 5 202 827 A (SOBER) 13 April 1993 see page 1, line 14 - line 22 see column 4, line 54 - column 5, line 30 see claim 1 ---	1-7
A	WO 96 05566 A (DAUGHTERY) 22 February 1996 see page 3, line 12 - line 16 see page 7, line 9 - line 16 ---	1-7
A	US 4 831 526 A (LUCHS ET AL) 16 May 1989 see abstract -----	1-7

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

4 August 1997

Date of mailing of the international search report

18.08.97

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Pottiez, M

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/06755

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4839804 A	13-06-89	NONE	
US 5202827 A	13-04-93	NONE	
WO 9605566 A	22-02-96	US 5557517 A	17-09-96
		AU 2601295 A	07-03-96
		CA 2196042 A	22-02-96
US 4831526 A	16-05-89	NONE	

